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## ALASTRIM.

By W. C. RUCKER, Surgeon, United States Public Health Service; Chief Quarantine Officer, Panama Canal.

### INTRODUCTORY NOTE.

An epidemic disease called "alastrim" was reported in the Caribbean littoral, Canada, and England during 1920. The importance of this disease from a quarantine standpoint has led to the compilation of this article. Acknowledgment is made to Castellani and Chalmers, whose Third Edition of their Manual of Tropical Medicine has been freely consulted; to the Kingston (Jamaica) Board of Health, whose circular on alastrim has been used in the preparation of this article; and to Prof. W. G. McCallum, of Johns Hopkins University, whose personal letter has been liberally used. It should be borne in mind that while alastrim, from a scientific viewpoint, may possibly be a separate disease entity, it has all the public health aspects of smallpox and, in the present state of our knowledge of its exact classification, should always be reported and combated as smallpox.

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*Synonyms.*—Varioloid-varicella, amaas, Kaffir milk-pox, Sanaga smallpox, West Indian modified smallpox, pseudo smallpox, weisse pocken.

*Definition.*—An acute febrile, easily communicable disease, closely resembling smallpox, as a mitigated aberrant form of which, from a public health standpoint, it must be regarded.

*Etiology.*—The causative agent is not proved. Guarnieri bodies (*Cytoryctes variolæ*) have been described in pus from the lesions and in smears made from corneal lesions of rabbits, 60 hours after inoculation with this pus. With dark-field illumination, McCallum found "particles resembling exactly Prowazek's bodies, and these were also found in the Berkefeld filtrates."

The disease is very infectious to man; both sexes and all ages are attacked. No racial immunity has been observed. The disease is found in the West Indies, South and Central America, South Africa, the Mediterranean area, and, more recently, in Great Britain. It is probable that the so-called "Cuban itch" and "Philippine itch" observed after the War with Spain, the mild form of smallpox

prevalent in America, and alastrim are identical. The disease is highly contagious, its causal organism being spread by both direct and indirect vection. Certain observers believe that the disease is largely spread by the air; but when the enormous number of daily contacts with fellow man is considered, the assumption of this theory to account for the rapid spread and persistence of the disease seems scarcely warranted. Overcrowding and all those things which favor the interchange of human secretions and excretions help to spread the disease. The exact classification of alastrim is still the subject of considerable discussion. It may be, and probably is, merely a mitigated form of smallpox, which, in an environment of low racial immunity, incomplete vaccination, or lowered vitality, might regain its lost virulence. It may be that the parasite is a separate species of the parent type.

The facts that the disease may occur rarely after recent successful vaccination, that more often vaccination may be successful after a prior attack of the disease, and that two attacks of the disease may rarely occur in the same person, are true of both "alastrim" and classical smallpox. The infectious agent probably is resident in the nasal and buccal secretions from a very early stage. The dried crusts and desquamated epithelium are also believed to act as vehicles of transmission. In the absence of definite knowledge of the causative agent and its portals of entry and exit to and from the human body, the prevention and eradication of the disease must be approached on the regular lines of a smallpox campaign. Smallpox, in the language of Sydenham, "has its peculiar kinds, which take one form during one series of years, and another during another." One attack of alastrim seems to confer lasting immunity.

*Pathology.*—Since the mortality from alastrim is very low, 0.5 to 1 per cent, little is known of the post-mortem pathology of the disease. At necropsy, in addition to the surface distribution of the pocks, pustules are seen on the palate, in the fauces, throughout the trachea, and into the bronchi. When the rash is very heavy, a marked subcutaneous edema is seen. This may be so intense as to completely close the eyes. The eruption first appears as papules, which become yellowish pustules and scabs. Desquamation is followed by little scarring, but by considerable pigmentation. In severe cases, trauma by scratching may produce denuded skin areas. Boils sometimes occur, and there may be slight alopecia.

*Symptoms.*—After an incubation period averaging 14 days, during which prodromal symptoms are rare, the disease is ushered in with malaise, fever (100° to 103° F.), generally accompanied by vomiting, mild headache and backache, and constipation. These symptoms are rarely severe and are suggestive of a mild gastric upset. The patient may vomit but once and the muscle and bone pains may be

so mild as to be disclosed to the examiner only by close questioning. The pains may, however, be generalized as in the initial stages of influenza. There may be a prodromal urticarial or measly rash.

The eruption occurs usually on the third day (occasionally as early as the second, or as late as the fifth day) as a few widely scattered, minute, red seed-like papules on the forehead, face, and forearm. Sometimes they are, even in the beginning, very numerous over the face and very small, being so closely set as to give to the skin of the forehead the texture of fine shark-skin. Usually the eruption at first resembles acne, but later more closely resembles smallpox or chicken pox. Successive crops appear on the abdomen, back, extremities, and face. Coincident with the appearance of the eruption, the temperature falls and the patient feels practically well until maturation takes place, with consequent skin tension and pain, particularly where the skin is thick, as in the palms and soles. Secondary fever does not often occur.

The eruption itself is not hard or shotty. In black skins, the papules appear slightly translucent. On the chest they are nearly always discrete and widely separate at first; over the arms rather less so. In the earlier stage they are not umbilicated except in the rare instances when they form about a hair. On the second or third day of the eruption they become unilocular vesicles, which contain a limpid, somewhat glutinous, fluid. The vesicles do not umbilicate. They become sharply defined, glistening, tense, bulging pustules surrounded by a red areola on the fifth (sometimes the sixth or seventh) day of the eruption. Usually they remain discrete, but in the more severe cases they may become confluent. In the late stages, after maturity, umbilication may occur when the pus has been discharged or inspissated. Drying and crusting usually begins on the sixth or seventh day, proceeds rapidly, and, except in the more severe cases, desquamation of the face is complete by the tenth or twelfth day after the beginning of the eruption. Sometimes some of the pocks never become pustular but start to dry in the vesicular stage, especially if they have been injured. In many cases the pus never advances to the stage of being thick and yellow. The drying begins on the face and then on the upper arms, chest, back, forearms, and legs about in order named. The roofs of the pustules sink, and the whole dries into a crust which ultimately may be rubbed off, leaving an area of central pigment atrophy, a thin line of scurfy epithelium and a wider zone of deep purplish pigmentation. This pigmentation may persist for several months, but the skin is smooth, with scarcely a trace of pitting or scarring.

The eruption is distributed much as it is in classical smallpox. The face and scalp are always attacked. Vesicles may be seen on the hard and soft palate and the fauces of the more severe cases. This

produces pains in the throat and enlargement of the glands at the angle of the jaw. Lesions have been observed on the eyelids, but not upon the conjunctiva. They occur on the lips and nostrils and over the nose and cheeks, the intervening skin frequently being so edematous as to be tightly stretched, the pocks looking as though they were stretched out upon a red drumhead. The eruption occurs on the extremities, the chest, and the upper part of the back. A few pocks can generally be found on the palms and soles.

Throughout its course the disease is exceedingly mild, and, except for the pains of onset and maturation, the patient experiences relatively little discomfort. There is no delirium, and patients are not really very ill and retain their appetites. Pocks in the hard skin of the palms and soles are painful. There is no itching, but rather a burning skin sensation which may interfere with the patient's sleeping. Patients rarely complain of the feeling of skin tension. With the extreme development of the pocks they seem mechanically disabled. They lie quietly in bed, rather depressed mentally, and very unwilling to move. As the pocks become dry and inspissated, the patients lose the depression and move about freely. Usually the progress of the disease is uneventful, without complications or sequelæ.

*Diagnosis.*—From the viewpoint of public health, "alastrim" should always be diagnosed and reported as smallpox. The gentleness of the stages of invasion and eruption, the absence or vagueness of the umbilication, and the general absence of destructive processes are all indicative of alastrim. The mildness of alastrim, even in an extensive epidemic, is distinctive. In a warm climate, at least, "alastrim" runs true to form and does not seem to increase in virulence. Epidemics of the classical form of smallpox or of chicken pox may occur simultaneously with "alastrim" and might tend to obscure the diagnosis, but the mildness of the attack and absence of umbilication and pitting in alastrim distinguish it from classical smallpox, while the occurrence of pustules differentiates it from chicken pox.

*Prognosis.*—The mortality from alastrim is surprisingly low. The disease is more severe in the unvaccinated and debilitated, and most of the deaths occur in pregnant women and very weak infants. Economically, it is important by reason of the rapidity of its spread and the temporary disablement of large numbers of persons.

*Treatment.*—This is symptomatic and hygienic. Isolation in hospital, suitable nursing, cleanliness, the relief of the early constipation, the evacuation of the contents of the pustules, which aids greatly in their heading and disappearance, the use of alkaline mouth washes and gargles, and the vaccination of all exposed persons and the general public, are the chief indications.

EDITOR'S NOTE.—Leake and Force, of the United States Public Health Service, in their studies on the immunological relationship of alastrim (1921), inoculated monkeys and rabbits, using crusts and pustule contents from alastrim patients in Jamaica and Haiti. They summarized the results of their experiments as follows:

A vesico-papular eruption was produced in monkeys by inoculation both with crusts and with vesicle contents from alastrim patients. The animals were protected against reinoculation with alastrim and vaccine virus. Rabbits inoculated with alastrim showed no eruption, but were almost completely immune to vaccine virus. Rabbits previously inoculated with vaccine virus gave positive intracutaneous reactions to smallpox crusts, alastrim material, and vaccine virus, but remained negative to chicken pox crusts.

The fact that definite immunity to vaccinia is produced by previous inoculations with alastrim is additional evidence of the essential identity of alastrim with smallpox. (Reprint No. 669 from the Public Health Reports, June 24, 1921, pp. 1437-1443.)

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### ARSENIC AS A LARVICIDE FOR ANOPHELINE LARVÆ.

By M. A. BARBER, Special Expert, and T. B. HAYNE, Technical Assistant, United States Public Health Service.<sup>1</sup>

Roubaud <sup>2</sup> has successfully used trioxymethylene, or paraformaldehyde, in poisoning anopheline larvæ. This powder, undiluted or mixed with some inert dust, is simply strewn on the surface of the water, where it is eaten by the larvæ. The poison acts on the nervous system of the insect, causing paralysis, and when eaten in sufficient quantity causes death within a few minutes. It is said to be harmless to any animal, aquatic or otherwise, except the surface-feeding anopheline larvæ. A sublethal dose is said by the author to confer on anopheline larvæ a degree of resistance to a subsequent dose.

We have confirmed the work of Roubaud to the extent that we have found trioxymethylene very toxic to anopheline larvæ, both in laboratory and in field tests. It seemed worth while, however, to extend this line of investigation and to search for some substance cheaper and more poisonous to the larvæ than trioxymethylene; since the use of a fine powder which acts through ingestion would seem to be a very promising measure against anopheline larvæ. These larvæ lie at the surface of the water, and in feeding turn the head halfway around into such a position that the feeding brushes carry to the mouth any particles lying on the surface-tension layer of the water. The larvæ swallow all floating substances that are small enough to

<sup>1</sup> Some of the later experiments in this work were done by Assistant Sanitary Engineer W. H. W. Komp.

<sup>2</sup> Roubaud, E.: *Compt. Rend. des Séances de l'Acad. des Sci.* Vol. 171, 1920, p. 51. *Ibid.*, Vol. 170, 1920, p. 1521.